

System User's Guide for the SIMSS/PM-1 Simulator

**Release 3.0
December 1999**

Prepared Under Contract NAS9-98100
by Computer Sciences Corporation

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About This Document

This document is the System User's Guide for the Scalable, Integrated, Multimission, Simulation Suite (SIMSS) PM-1 Simulator developed for the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center (GSFC). The simulator is one of the deliverables of the EOSDIS Test System (ETS) PM-1 Development Task under the CSOC contract. The System User's Guide provides an overview of operational concepts and procedures for this simulator. This document is approved by GSFC Code 581, and will be maintained by Computer Sciences Corporation (CSC) under the CSOC contract.

Who Should Use This Document

This document is for anyone who wishes to use the SIMSS/PM-1 Simulator. To use this simulator effectively you should already be familiar with the basics of the Windows NT Operating System as well as be familiar with the EOS PM-1 Spacecraft.

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SIMSS Client-Server Architecture

The Scalable, Integrated, Multimission, Simulation Suite (SIMSS) is a distributed, component-based, plug-and-play, client-server system useful for performing realtime simulations and communications testing in support of NASA projects.

SIMSS-1.0 Overview

SIMSS runs on one or more Windows NT workstations. It is designed to be user-configurable or to use predefined configurations for routine operations.

Terminology:

- Client:** The workstation on which the user interface runs. It also refers to the applications making up the user interface.
- Server:** The workstation on which the actual data processing is performed. It also refers to the applications making up the data processing component.
- Module:** A self-contained SIMSS component that receives, processes, or transmits data, or any combination of the three.
- Channel:** An interface or port through which a module receives or transmits data. A module may have zero to many channels.
- Link:** A directional connection between module channels. A link connects an output channel of one module with the input channel of another module.
- Project:** A collection of modules and links intended to perform a specific function such as spacecraft simulation, data quality monitoring, or data conversion.
- Event Message:** A time-tagged text message generated by the modules to inform the operator. Event messages may report warning or error conditions as well as successful activities.
- Directive:** A text-based command entry line that submits operator instructions to the modules. The directive window is below the configuration window in the main SIMSS display.
- Container:** A repository internal to each module that contains all of the vital data for that module. The container is used to exchange data between the client and server. Built-in functions of the container support save and restore operations.

SIMSS-2.0 Installing A New Release

SIMSS-2.1 Installing the Client

To install the NeTT client, run *jdk1_2_1-win.exe* located in the *\jdk* folder on the delivery CD. After JDK1.2.1 is installed, the next step is to run *setup.exe* in the *\client* folder on the CD and follow the prompts. Upon completion of the client installation, a NeTT Client icon will be installed on the desktop.

SIMSS-2.2 Installing the Server

To install the NeTT server, run *setup.exe* in the *\server* folder on the CD and follow the prompts. Upon completion of the server installation, a NeTT Server icon will be installed on the desktop.

Note: The user needs administrative rights in order to install the NeTT Server.

SIMSS-3.0 Configuration

By default the configuration files are located in the folder “*c:\Program Files\CSC\NeTTClient\properties*”. Before running the NeTT Client, please check that the correct IP address for running the NeTT Server is in the *servers.txt* file. The format for entries in this file is:

Servername, IP address

Example:

localhost,127.0.0.1

SIMSS-4.0 Run-time Operation

The SIMSS architecture is capable of supporting a variety of applications by connecting generic and mission specific modules in different combinations. The general steps for starting up a SIMSS project are summarized in the next subsection. More detailed examples of these steps are provided in SIMSS-5.0, which describes the graphical user interface.

While SIMSS applications can perform vastly different functions and have customized user interfaces tailored to those functions, there are two run-time regions of the project window that are common to all SIMSS projects. They are the operator directive region and the event log display region. These regions are described in later subsections.

Other chapters in this system user's guide are devoted to the various generic and mission specific modules. Please refer to these chapters for detailed information on module configuration and run-time operations.

SIMSS-4.1 Project Startup Sequence

SIMSS Startup Steps	Description
1) Start the Server	The SIMSS/NeTT Server should always be started prior to starting the SIMSS/NeTT Client. Double-click the Server icon on the PC desktop. When the Server is started, a text window is created.
2) Start the Client	Double-click the SIMSS/NeTT Client icon on the desktop. When the Client is started, a Client text window is created and then the graphical user interface is started with the NeTT Client main window.
3) Add (or Restore) a Project	Click on the NeTT Client main window's Project menu and select "Add Project". Or, the "Restore From" selection can be used to load a previously saved project. A project window is created within the main window.
4) Connect Project to Server	In the project window, click the System menu and select the "Connect" option. A list of available servers will be shown. Select a server for the connection.
5) Add Modules	In the project window, click the Module menu and select "Add Module". From the Module Selection window, click on the module to be added and the OK button. Click again in the project window for placement of the module's icon. Repeat this step until all desired modules have been added.
6) Create Links Note: Refer to module input and output link descriptions in order to connect output links to the appropriate input links!	In the project window, click the Module menu and select "Create Links". Click on a module's border and drag the cursor to the border of another module and click again. If either module has multiple links, a popup window will appear for specification of the exact links. Repeat this step to create all desired links. To cancel link creation mode, click on the Module menu and select "Design".
7) Configure Modules	Click in the center of the module and select "Configure" from the popup menu. Perform module specific configurations. Repeat for as many modules as needed.
8) Lock the Project	In the project window, click the Run menu and "Lock".
9) Save the Project (optional)	Click the project window's System menu and select "Save Project". Specify a name for the project save file.
10) Run the Project	In the project window, click the Run menu and select "Run". All of the modules in the project will be started. Click the center of any module to access its run-time options.

SIMSS-4.2 Project Directive Region

If any module in a project accepts operator directives, the directive region in the lower right side of the project window frame is activated. If the project's event log is being shown, it appears below this region. The directive region has a module indicator button and a data entry field. When the module indicator button is clicked, a list of the modules accepting directives is shown. Click to select the module to process a directive. The button is labeled with the currently selected module. In the example below, the Ground Station module is selected. Click in the data entry field to the right of the module button to start entering a directive. Use the keyboard's enter key to send the directive to the module. Note that the directive entry line is not case sensitive. The **Set** and **Get** directives are available to any module that accepts directives and has container variables.



SIMSS-4.2.1 Set Directive

The **set** directive may be used to change the value of any modifiable variable in the container for the indicated module. The format of the **set** directive is

set name value

where *name* is a container variable name and *value* is a decimal number. The names of variables are provided in the container description for each module. If the variable is successfully set, an event message of the form

“module: *name* set to *value*”

informs the operator of the change. If the variable name is not recognized or the variable cannot be modified, an event message of the type

“module: *name* invalid, read-only or not found”

will inform the operator. If unsuccessful, verify that the module indicator is correct, that the variable name spelling is correct and that the variable is not defined as read-only.

SIMSS-4.2.2 Get Directive

The **get** directive may be used to display the value of any variable in the container for the indicated module. The format of the **get** directive is

get name

If the name matches a variable in the module's container, an event message of the form

“module: *name* = value”

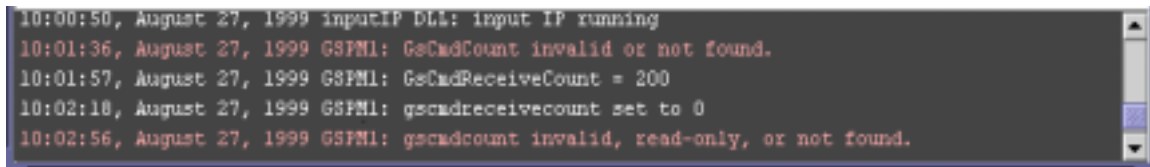
is written to the event message log. If the name doesn't match a container variable, an error event message of the form

“module: *name* invalid or not found”

will be produced. If unsuccessful, check the setting of the module indicator and the spelling of the container variable name.

SIMSS-4.3 Project Event Log Region

Many SIMSS modules send informative, warning or error event messages to the project's event log during configuration and run-time operations. To open the event log region at the bottom of the project window, select the “Show Event Log” option from the System menu. The example shown includes event messages from **get** and **set** directives.

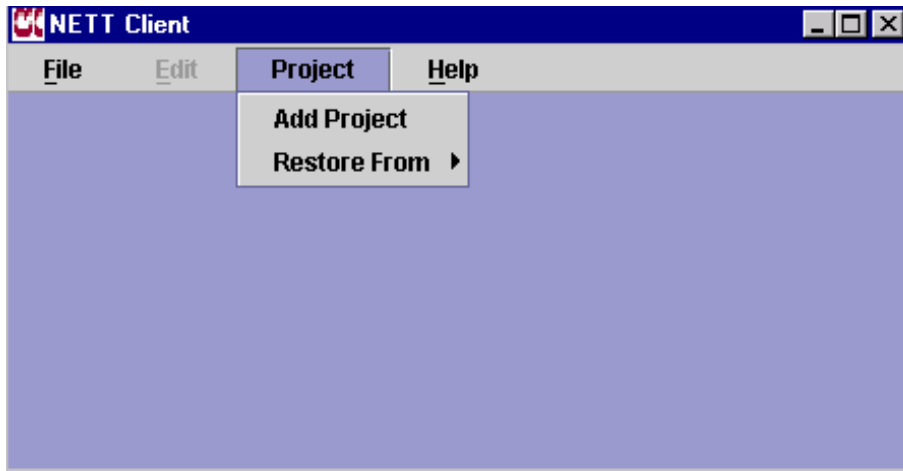


```
10:00:50, August 27, 1999 inputIP DLL: input IP running
10:01:36, August 27, 1999 GSPM1: GsCmdCount invalid or not found.
10:01:57, August 27, 1999 GSPM1: GsCmdReceiveCount = 200
10:02:18, August 27, 1999 GSPM1: gscmdreceivecount set to 0
10:02:56, August 27, 1999 GSPM1: gscmdcount invalid, read-only, or not found.
```

SIMSS-5.0 Displays

SIMSS-5.1 NeTT Client Main Window

When the NeTT Client is started, the main window appears. The File menu contains an “Exit” option and the Project menu contains options to add a new project and restore a project.

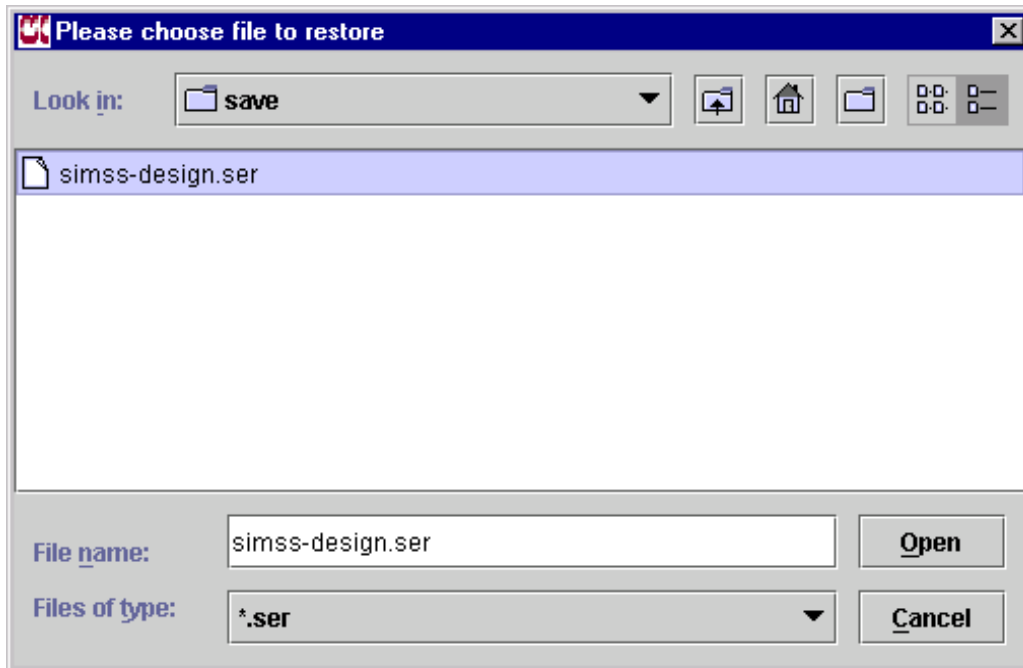


SIMSS-5.1.1 Add Project

To create a new project, select the “Add Project” item from the Project menu. This will add a project window within the NeTT Client window. In future releases, multiple project windows may be created within the main window.

SIMSS-5.1.2 Restore Project

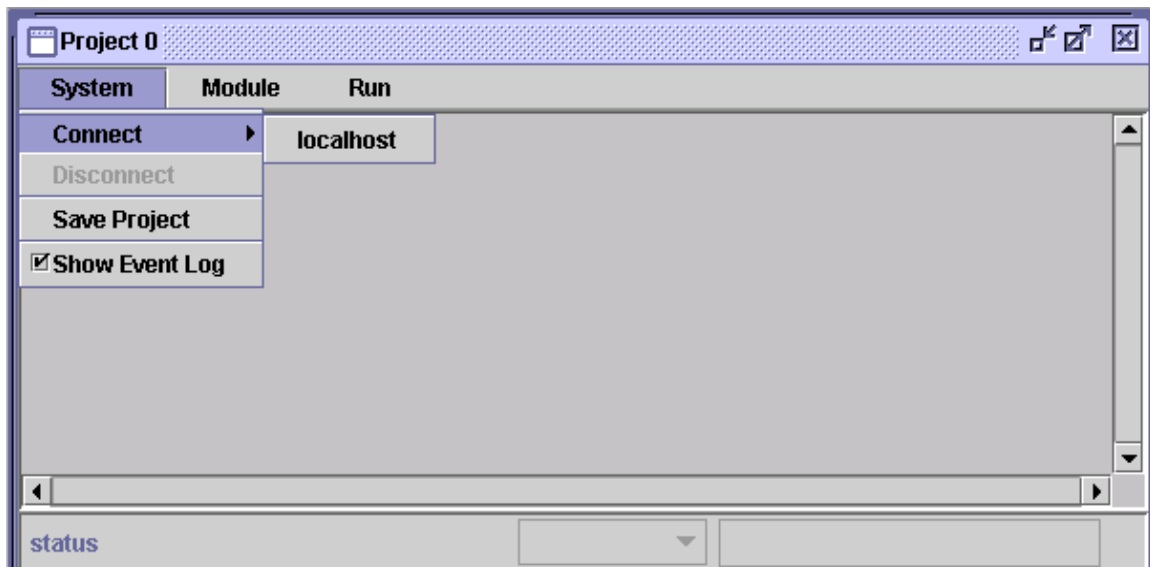
To restore an existing project, select the “Restore From” item from the Project menu. The following file selection screen will appear.



The system will search the save directory by default but another directory may be selected by clicking the Save Folder button. Select a file and click the **Open** button. Click on the **Cancel** button to dismiss the display without restoring a project.

SIMSS-5.2 Project Window

Each SIMSS application is built within a separate project.



To create a project, select the “Add Project” item from the NeTT Client Project menu. This will add a project window that contains a System menu, a Module menu and a Run menu. At the bottom of the project window is a status field. At the bottom right is the directive region of the screen.

SIMSS-5.2.1 System Menu

The System menu on the Project window contains the following choices.

System Menu Item	Description
Connect	Connects the project to a server
Disconnect	Disconnects the project from a server
Save Project	Saves the project design to file
Show Event Log	When this option is enabled, the event log portion of the Project window is displayed.

SIMSS-5.2.1.1 Connect to Server

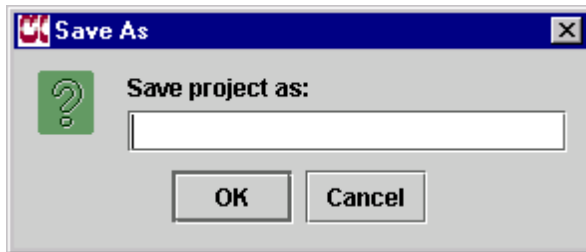
The client must be connected to a server in order to function. To make a connection to a server, select the “Connect” option from the System menu. A menu of available servers will be displayed. Click to select a server for the connection. In the above picture, only one server was available. After the client has been connected to a server, the “Disconnect” option will be enabled on the System menu and the “Connect” option will be disabled.

SIMSS-5.2.1.2 Disconnect from Server

To disconnect the client from the server, select the “Disconnect” option from the System menu. After the client has disconnected from the server, the “Disconnect” option will be disabled on the System menu and the “Connect” option will be enabled.

SIMSS-5.2.1.3 Save Project

This option allows the user to store the project’s design to a file. Different design configurations of SIMSS modules may be desired for different testing environments. To save the project, select the “Save Project” option. The following screen will appear.



Enter the file name for storage of the current project and click the **OK** button to have project information written into it. The file name will have “.ser” appended to the end. Clicking **Cancel** will close this window without performing a save.

SIMSS-5.2.1.4 Show Event Log

Each project has an event log that displays time tagged event messages received from all of its modules. The event log may be optionally displayed as a scrolling region at the bottom of the project window. Modules may send informative, warning or error messages to the event log during configuration and run-time operations.

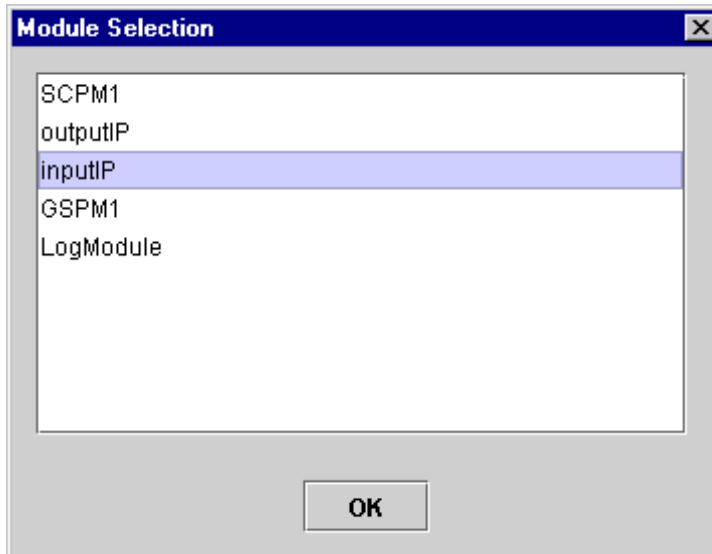
SIMSS-5.2.2 Module Menu

The Module menu on the Project window contains the following choices.

Module Menu Item	Description
Add Module	Add a module to the project's design diagram
Create Links	Create a link between modules
Design	Allows editing of the project design diagram

SIMSS-5.2.2.1 Add Module

To add a module to the project, select the “Add Module” option from the Module menu.



A list of the modules available from the server will be displayed. Click to select a module and then click the **OK** button.

Position the cursor within the project window where the top left corner of the module's symbol should be drawn and click. A rectangle representing the module will be drawn at that location. The rectangle will have a wide cyan border while in design mode.

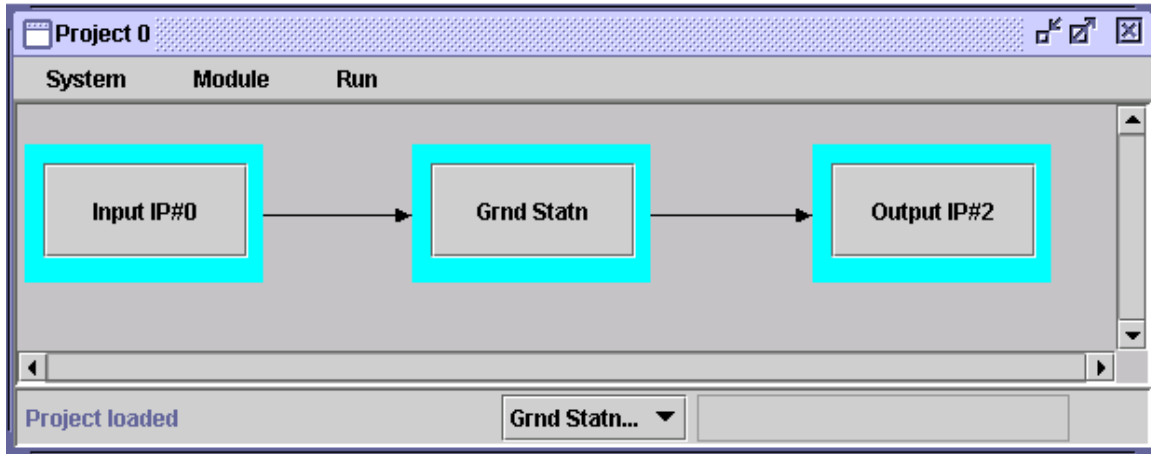
If a module is added that accepts operator directives, the directive region of the project window becomes accessible.

SIMSS-5.2.2.2 Create Links

Links are used to connect the input and output channels between modules for a given project. In the example shown below, the output channel of an Input IP module is linked to an input channel of a Ground Station module.

To create a link,

- select the “Create Links” option from the Module menu,
- position the crosshair cursor on the highlighted edge of the source module and click,
- drag the link line to the destination module's edge and click again.



When multiple links are defined for a module, the user will be prompted to choose a channel number for the source and destination links as appropriate. Refer to module specific information for the number of input and output channels a module can have and how they should be configured. The cursor remains in create links mode to allow for the creation of additional links. The cursor appears as a crosshair symbol until a different module menu option is selected.

If multiple links are created between two modules, additional clicks may be done to anchor the link lines apart for visibility.

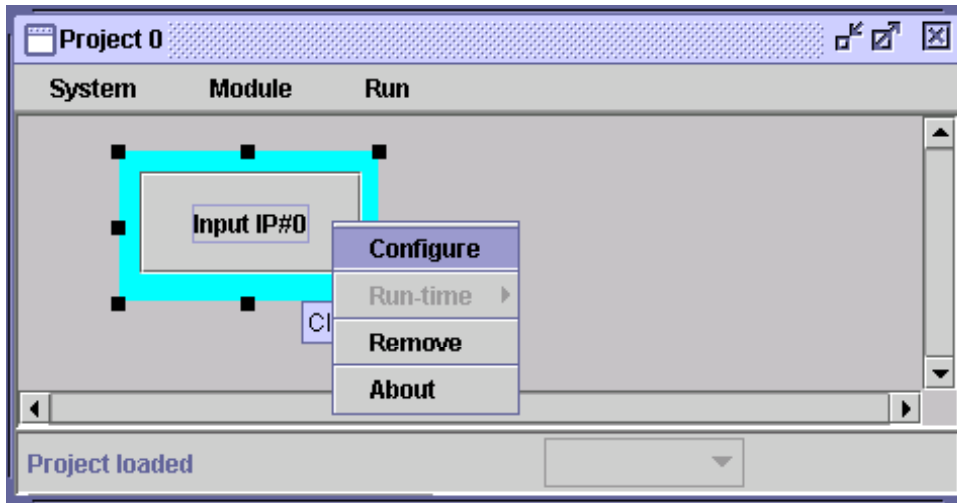
SIMSS-5.2.2.3 Design Mode

After the “Create Links” option has been used, the cursor remains as a crosshair symbol and the system remains in link creation mode. To cancel this mode, click the “Design” option from the Module menu. The cursor is changed back into a pointer symbol and may be used to select items of the design diagram for modification.

SIMSS-5.2.2.4 Module Pop-Up Menu

Clicking in the center of a module activates a pop-up menu with the following choices.

Module Pop-Up Menu	Description
Configure	Provides access to module-specific configuration options.
Run-time	Provides access to module-specific run-time options. The “Run-time” option is only available when the project is running.
Remove	Removes the module from the project.
About	Provides information about the module.



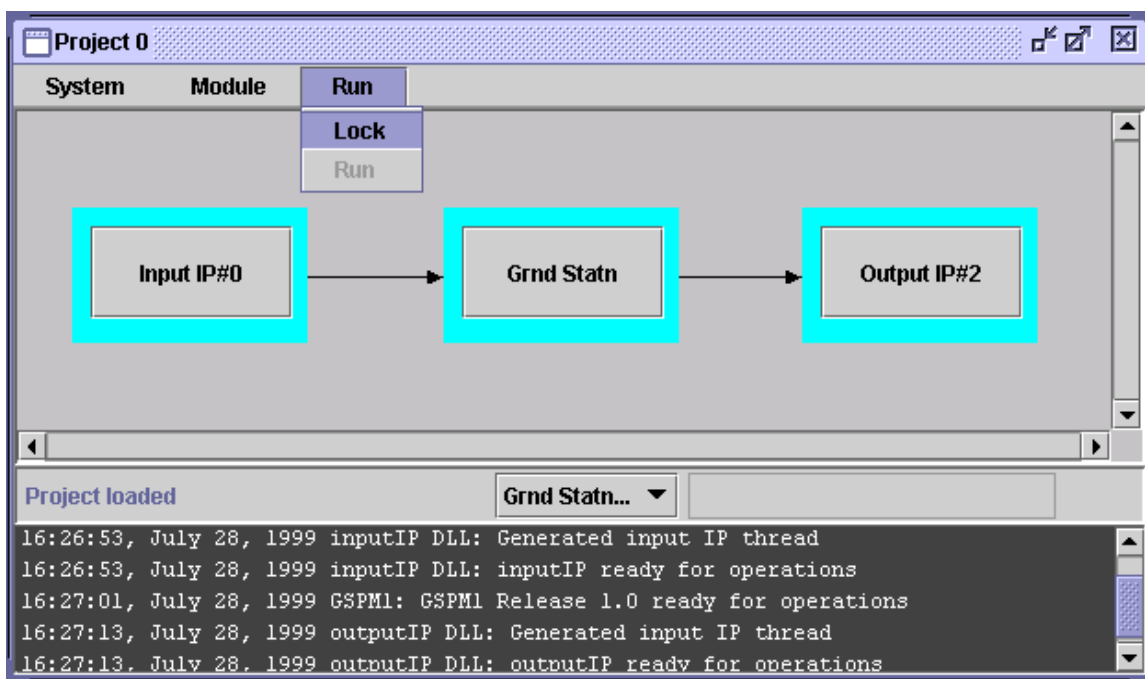
The actions initiated by the “Configure” and “Run-time” options are different for every module and are described in the other chapters of this system user’s guide that are dedicated to specific modules.

SIMSS-5.2.3 Run Menu

The Run menu on the Project window contains the following choices.

Run Menu Item	Description
Lock/Unlock	Locks/Unlocks the project’s design diagram
Run/Stop	Starts/Stops the project’s execution

SIMSS-5.2.3.1 Locking a Project



Prior to running a project, the user must lock its design by clicking the “Lock” option from the Run menu. After the design is locked, the “Lock” option is replaced by the “Unlock” option and the “Run” option becomes available on the Run menu.

SIMSS-5.2.3.2 Unlocking a Project

Click the “Unlock” option from the Run menu to allow modification to the project's design diagram. The “Unlock” option is then replaced on the Run menu with a “Lock” option.

SIMSS-5.2.3.3 Running a Project

Click the “Run” option from the Run menu to start running all of the modules of the project. The borders of the modules will change to green to indicate run mode. The “Run” option is then replaced with a “Stop” option.

Click on specific modules to get their pop-up menus. See SIMSS-5.2.2.4 Module Pop-Up Menu for an example. Click on the Run-time option for module specific displays or actions. Please refer to module chapters in this system user's guide for additional information on module configuration and run-time displays.

SIMSS-5.2.3.4 Stopping a Project

Click the “Stop” option from the Run menu to stop execution of the modules of the project. The borders of the modules will change to red to indicate the stopped condition. The “Stop” option is then replaced with a “Run” option on the Run menu.

EDOS Ground Station Module for PM-1 (GSPM1)

GSPM1-1.0 Overview

The Ground Station (GS) module is responsible for adding an EDOS Service header (ESH) to telemetry packets and transmitting the data as EDOS Data Units (EDUs). The GS module will also provide a user interface to set the EDOS Service header fields. The GS module also receives Command Data Blocks (CDB), strips off the Ground Message Header (GMH), and transmits Command Link Transmission Units (CLTUs).

GSPM1-2.0 Inputs

Ch.	Data expected	Validation performed	Processing performed
1	EDOS Command Data Blocks	None	Ground Message Header removed, resulting data transmitted through output channel 1
2	Telemetry packets	None	EDOS Service Header added, resulting data transmitted through output channel 2
3	Command Link Control Words (CLCWs)	None	EDOS Service Header added, resulting data transmitted through output channel 3

GSPM1-3.0 Outputs

Ch.	Description
1	Command stream with acquisition sequence and CLTUs
2	EDOS Data Units (EDUs) containing telemetry packets
3	EDOS Data Units (EDUs) containing CLCWs

GSPM1-4.0 Container Items

Name	Type	Read Only	Description
GSCmdBuffer	Buffer	No	Most recent command block received
GSTlmCh1Buffer	Buffer	No	Most recent output channel 1 block sent
GSTlmCh2Buffer	Buffer	No	Most recent output channel 2 block sent
GSCmdReceiveCount	Fixed	No	Number of command blocks received
GSTlmCh1TransmitCount	Fixed	No	Number of channel 1 blocks sent
GSTlmCh2TransmitCount	Fixed	No	Number of channel 2 blocks sent

GSPM1-5.0 Displays

To access the displays for this module, first click on the center of the module in the project window. The module pop-up menu will appear.

Module Pop-Up Menu Item	Description
Configure	Access configuration menu this module
Run-time	Access the Run-time menu for the module
Remove	Remove module from the project
About	Display generic module information

GSPM1-5.1 Configuration

There are no configuration displays for this module.

GSPM1-5.2 Run-time

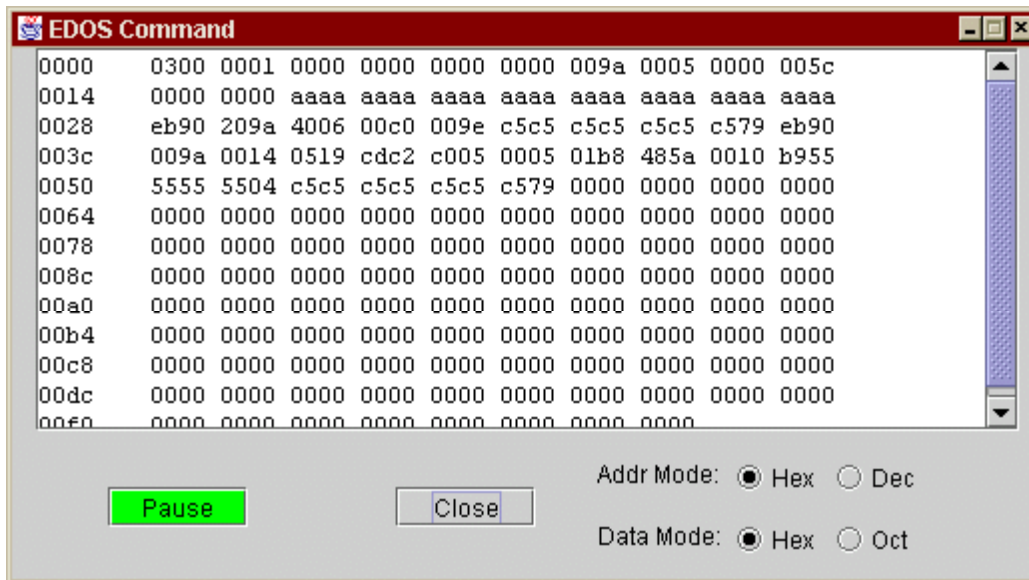
There are four displays available from the Run-time menu. They are described in the following sections.

Run-time Menu Item	Description
Show Cmd Packet	Display the command buffer
Show Tlm CH1 Packet	Display the housekeeping telemetry buffer
Show Status	Show counts of commands and telemetry packets
Set/Display GMT	Display time fields for possible modification

GSPM1-5.2.1 Show Command Packet



The command packet display shows the header and, optionally (by pressing the **Dump** button), the contents of the most recent command block received, including the Ground Message Header.

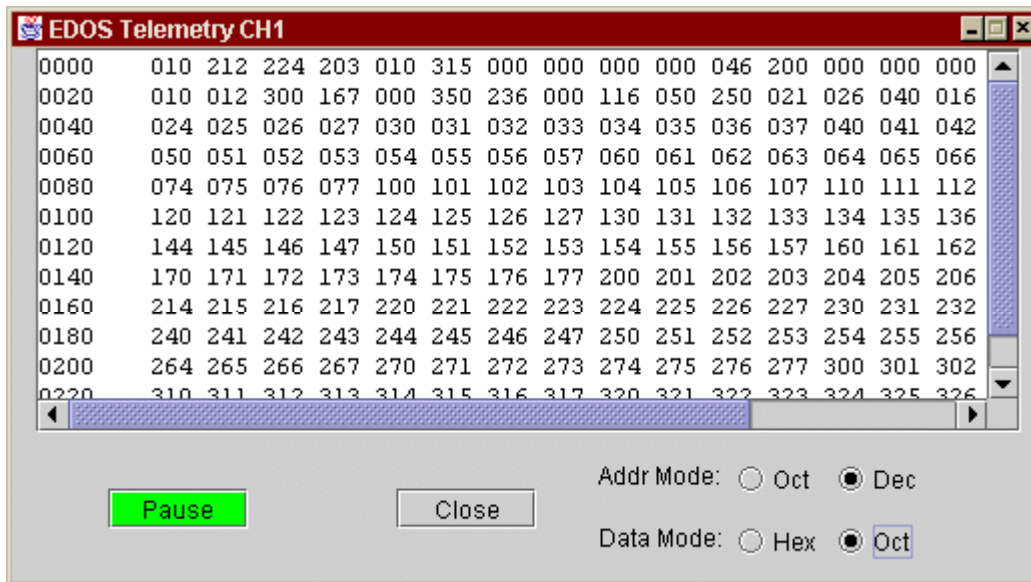


The address field of the dump display may be toggled between hexadecimal and decimal display formats. The data portion may be toggled between hexadecimal and octal formats.

GSPM1-5.2.2 Show Telemetry Channel 1 Packet

The telemetry channel 1 packet display shows the header and, optionally (by pressing the **Dump** button), the contents of the most recent telemetry block as transmitted through telemetry channel 1 (module channel 2).

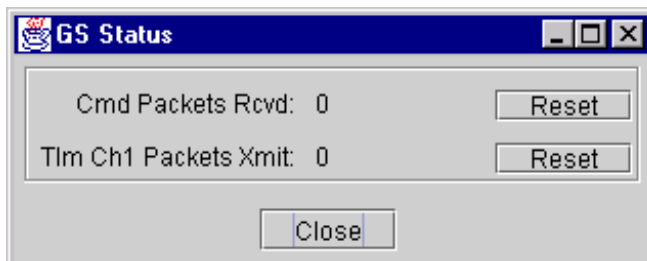




GSPM1-5.2.3 Show CLCW Packet (Future)

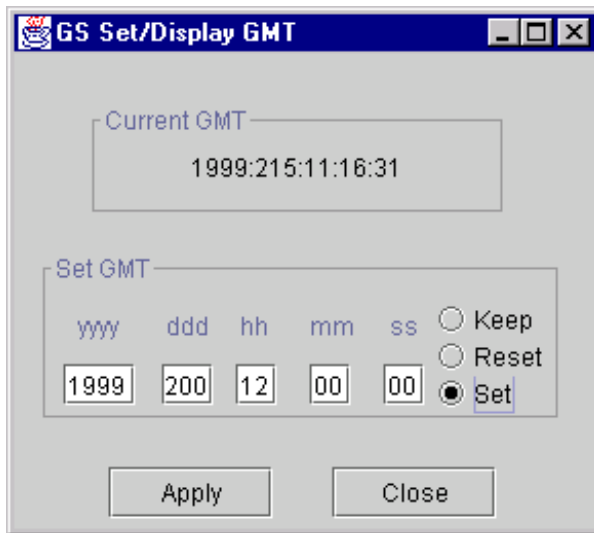
In a future release, the CLCW channel packets will be displayed in header and dump formats similar to those used for the housekeeping telemetry packets.

GSPM1-5.2.4 Show Status



The status display shows the number of command blocks received and the number of housekeeping telemetry blocks transmitted. The **Reset** button may be used to zero out the counter in the same row.

GSPM1-5.2.5 Set/Display GMT



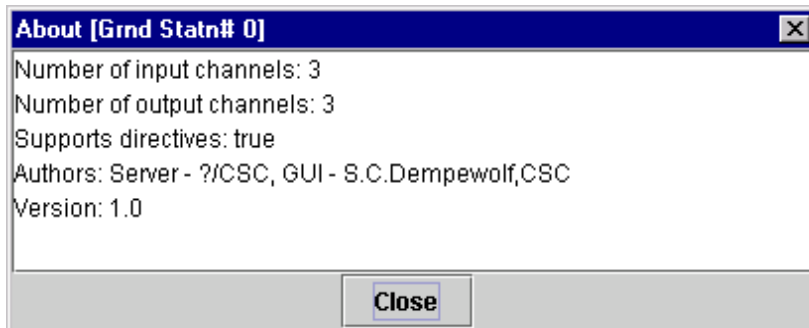
This display shows the current GMT time that is converted and stored in the EDOS Server Header. The user may **Set** the GMT time fields manually, **Keep** the time currently being used, or **Reset** time to the current system time.

The data entry fields are year, day of year, hour of day, minute of hour, and second of minute.

Click the **Apply** button for the actions to take effect. Click the **Close** button to dismiss the window with no further action taken.

GSPM1-5.3 About

To display generic information about the GS module, choose the “About” option from the module pop-up menu.



GSPM1-6.0 Special Operating Instructions

There are no special operating instructions for the current release.

Spacecraft Simulation Module for PM-1 (SCPM1)

SCPM1-1.0 Overview

The functions of the Spacecraft (SC) module include generation and transmission of formatted telemetry packets, receipt of command link transmission Units (CLTUs), and maintenance of GMT and spacecraft time. GMT time is maintained separately by this module for time tagging of event messages. Spacecraft time is maintained as an offset from the PM-1 epoch and is inserted into telemetry packets prior to sending them to the Ground Station module. This module is also capable of displaying telemetry packets and received commands under operator direction.

SCPM1-2.0 Inputs

Ch.	Data expected	Validation performed	Processing performed
1	Command stream	CCSDS and PM-1 specific	Commands parsed and validated per CCSDS standard and PM-1 extensions. Event messages generated on valid or invalid commands.

SCPM1-3.0 Outputs

Ch.	Description
1	Housekeeping telemetry packets
2	Command Link Control Words (CLCWs)

SCPM1-4.0 Container Items

SCPM1-4.1 Telemetry Container Items

Name	Type	Read Only	Description
clcwpkt	Fixed	No	CLCW packet buffer
PM1TlmChannel1Enabled	Fixed	No	Channel 1 enabled flag (0=disabled, 1=enabled)
PM1TlmChannel1FrameCount	Fixed	No	Channel 1 frames transmitted count
TransmitCLCW	Fixed	No	CLCW enabled flag (0=disabled, 1=enabled)
PM1CLCWFrameCount	Fixed	No	CLCW channel transmitted count
TlmCUCpfield	Fixed	No	P-field for CUC time in packet header
TlmCUCpfieldextension	Fixed	No	P-field extension for CUC time in packet header

For each APID in telemetry there is a container buffer to hold that APID's packet. For example, the container buffer for APID 397 is named "TlmPacket0397". Where "<APID>" appears in the following table, substitute the APID in 4 decimal digits.

Name	Type	Read Only	Description
TlmPacket<APID>	Buffer	No	Buffer for specified APID's telemetry packet.
TlmPacket<APID>SequenceCount	Fixed	No	Sequence count for APID's packet header
TlmPacket<APID>SequenceFlag	Fixed	No	Sequence flag for APID's packet header
TlmPacket<APID>APID	Fixed	No	APID for packet header
TlmPacket<APID>SecondaryHeaderFlag	Fixed	No	Secondary header flag for APID's packet header
TlmPacket<APID>DataLength	Fixed	No	Data length for APID's packet header
TlmPacket<APID>Version	Fixed	No	Version for APID's packet header
TlmPacket<APID>Type	Fixed	No	Type for APID's packet header

SCPM1-4.2 Command Container Items

The container items for the command processing fall into four major groups: mission specific items, processing flags, processing buffers and counts. The initial values for counts, flags and buffers are zero. Non-trivial initial values for other items are shown in parentheses following the description.

SCPM1-4.2.1 Mission Specific Container Items

The initial values for these items were taken from the EOS PM-1 Spacecraft to Ground ICD (D22262) Dated October 15, 1998.

Name	Type	Read Only	Description
Pm1cmdCltuCodeblockSize	Fixed	No	Codeblock size in bytes (8)
Pm1cmdCltuExpectedStartSequence	Buffer 2 bytes	No	Expected CLTU Start Sequence Buffer (EB90 ₁₆)
Pm1cmdCltuExpectedTailSequence	Buffer 8 bytes	No	Expected CLTU Tail Sequence Buffer (C5C5 C5C5 C5C5 C579 ₁₆)
Pm1cmdCriticalTieAVCID	Fixed	No	Virtual Channel ID (VCID) for TIE-A critical commands (16)
Pm1cmdCriticalTieBVCID	Fixed	No	Virtual Channel ID for TIE-B critical commands (17)
Pm1cmdSCID	Fixed	No	PM-1 Spacecraft Identifier (9A ₁₆)

SCPM1-4.2.2 Command Processing Container Fields/Flags

Name	Type	Read Only	Description
Pm1cmdEnabled	Fixed	No	Command processing enabled flag. The border of the main display command box shows the current status of this flag. (0=disabled/red border, 1=enabled/green border)
Pm1cmdCLTUValidation	Fixed	No	Command CLTU validation enabled flag. (0=disabled, 1=enabled) This flag corresponds to the CLTU option from the Modify Validation Criteria screen.
Pm1cmdCodeblockValidation	Fixed	No	Command codeblock parity validation enabled flag. (0=disabled, 1=enabled) This flag corresponds to the BCH Error Code option from the Modify Validation Criteria screen.
Pm1cmdFrameValidation	Fixed	No	Command transfer frame header validation enabled flag. (0=disabled, 1=enabled). This flag corresponds to the Transfer Frame Header option from the Modify Validation Criteria screen.
Pm1cmdFARMValidation	Fixed	No	Command Frame Acceptance and Reporting Mechanism (FARM) validation enabled flag. (0=disabled, 1=enabled) This flag corresponds to the FARM option from the Modify Validation Criteria screen.
Pm1cmdPacketValidation	Fixed	No	Command packet validation enabled flag. (0=disabled, 1=enabled) This flag corresponds to the User Packet Header option from the Modify Validation Criteria screen.
Pm1cmdDebugEnabled	Fixed	No	Command subsystem debug event messages flag. (0=disabled, 1=enabled) When enabled, additional event messages are generated throughout command ingest processing. This is primarily a developer's tool.
Pm1cmdSpaceClwCWT	Fixed	No	Spacecraft CLCW Control Word Type
Pm1cmdSpaceClwVersion	Fixed	No	Spacecraft CLCW Version
Pm1cmdSpaceClwStatus	Fixed	No	Spacecraft CLCW Status
Pm1cmdSpaceClwCOP	Fixed	No	Spacecraft CLCW COP In Effect

Pm1cmdSpaceClwVCID	Fixed	No	Spacecraft CLCW VCID (0)
Pm1cmdSpaceClwSpare1	Fixed	No	Spacecraft CLCW Spare field 1
Pm1cmdSpaceClwNoRFAvail	Fixed	No	Spacecraft CLCW No RF Avail Flag
Pm1cmdSpaceClwNoBitLock	Fixed	No	Spacecraft CLCW No Bit Lock Flag
Pm1cmdSpaceClwLockout	Fixed	No	Spacecraft CLCW Lockout Flag
Pm1cmdSpaceClwWait	Fixed	No	Spacecraft CLCW Wait Flag
Pm1cmdSpaceClwRetransmit	Fixed	No	Spacecraft CLCW Retransmit Flag
Pm1cmdSpaceClwFarmCount	Fixed	No	Spacecraft CLCW Farm-B Counter
Pm1cmdSpaceClwSpare2	Fixed	No	Spacecraft CLCW Spare field 2
Pm1cmdSpaceClwReport	Fixed	No	Spacecraft CLCW Report Value
Pm1cmdInstrClwCWT	Fixed	No	Instrument CLCW Control Word Type
Pm1cmdInstrClwVersion	Fixed	No	Instrument CLCW Version
Pm1cmdInstrClwStatus	Fixed	No	Instrument CLCW Status
Pm1cmdInstrClwCOP	Fixed	No	Instrument CLCW COP In Effect
Pm1cmdInstrClwVCID	Fixed	No	Instrument CLCW VCID (1)
Pm1cmdInstrClwSpare1	Fixed	No	Instrument CLCW Spare field 1
Pm1cmdInstrClwNoRFAvail	Fixed	No	Instrument CLCW No RF Avail Flag
Pm1cmdInstrClwNoBitLock	Fixed	No	Instrument CLCW No Bit Lock Flag
Pm1cmdInstrClwLockout	Fixed	No	Instrument CLCW Lockout Flag
Pm1cmdInstrClwWait	Fixed	No	Instrument CLCW Wait Flag
Pm1cmdInstrClwRetransmit	Fixed	No	Instrument CLCW Retransmit Flag
Pm1cmdInstrClwFarmCount	Fixed	No	Instrument CLCW Farm-B Counter
Pm1cmdInstrClwSpare2	Fixed	No	Instrument CLCW Spare field 2
Pm1cmdInstrClwReport	Fixed	No	Instrument CLCW Report Value
Pm1cmdSlidingWindowSize	Fixed	No	FARM-1 Sliding Window Size (180)

SCPM1-4.2.3 Command Container Buffers

Name	Type	Read Only	Description
Pm1cmdPolyRemainderTbl	Buffer 256 bytes	No	Polynomial remainder table for parity calculation.
Pm1cmdSpacecraftCLCW	Buffer 4 bytes	Yes	Spacecraft Virtual Channel Command Link Control Word Buffer (individual fields may be modified, see previous table)
Pm1cmdInstrumentCLCW	Buffer 4 bytes	Yes	Instrument Virtual Channel CLCW Buffer (individual fields may be modified, see previous table)
Pm1cmdScPkt	Buffer 128 bytes	No	Spacecraft Command Packet Buffer
Pm1cmdInstrPkt	Buffer 128 bytes	No	Instrument Command Packet Buffer
Pm1cmdFrameBuffer	Buffer 256 bytes	No	Command Transfer Frame Buffer

Pm1cmdCLTU	Buffer 900 bytes	No	Command Link Transmission Unit Buffer
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SCPM1-4.2.4 Command Container Counters

Name	Type	Read Only	Description
Pm1cmdTotalCLTUs	Fixed	No	Count of all CLTUs received
Pm1cmdValidCLTUs	Fixed	No	Count of valid CLTUs
Pm1cmdRejectCLTUs	Fixed	No	Count of invalid CLTUs
Pm1cmdTotalCodeblocks	Fixed	No	Count of all Codeblocks
Pm1cmdValidCodeblocks	Fixed	No	Count of valid Codeblocks
Pm1cmdRejectCodeblocks	Fixed	No	Count of invalid Codeblocks
Pm1cmdTotalTransferFrames	Fixed	No	Count of all Transfer Frames
Pm1cmdValidTransferFrames	Fixed	No	Count of valid Transfer Frames
Pm1cmdErrorTransferFrames	Fixed	No	Count of invalid Transfer Frames
Pm1cmdADFrames	Fixed	No	Count of Type AD Transfer Frames
Pm1cmdACFrames	Fixed	No	Count of Type AC Transfer Frames (should not be any for PM-1 mission)
Pm1cmdBCCMDS	Fixed	No	Count of Type BC Transfer Frames (should be one command per frame)
Pm1cmdBDCMDS	Fixed	No	Count of Type BD Transfer Frames (should be one command per frame)
Pm1cmdScCMDS	Fixed	No	Count of all Spacecraft Packets
Pm1cmdValidSpacecraftPkts	Fixed	No	Count of valid Spacecraft Packets
Pm1cmdErrorSpacecraftPkts	Fixed	No	Count of invalid Spacecraft Packets
Pm1cmdInstrCMDS	Fixed	No	Count of all Instrument Packets
Pm1cmdValidInstrumentPkts	Fixed	No	Count of valid Instrument Packets
Pm1cmdErrorInstrumentPkts	Fixed	No	Count of invalid Instrument Packets
Pm1cmdIgnoredCLTUs	Fixed	No	Number of CLTUs ignored while command processing is disabled. If commands are received while the main display command box is disabled/red, this counter is updated and the commands are dropped.

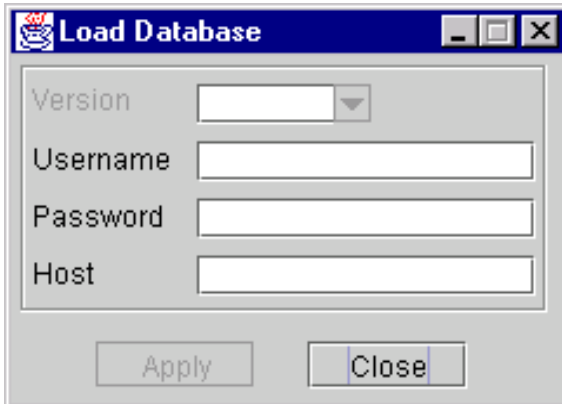
SCPM1-5.0 Displays

To access the displays for this module, first click on the center of the SCPM1 module in the project window. The following items will appear in a pop-up menu.

Module Pop-Up Menu Item	Description
Configure	Access the configuration display
Run-time	Access the Run-time menu for the module
Remove	Remove module from the project
About	Display generic module information

SCPM1-5.1 Configuration

When the “Configure” option is selected from the module pop-up menu, the Load Database display appears.



Load Database Field	Description
Version	(Future) Specifies which version of database to use
Username	Specifies the user account
Password	Specifies the password for the user account
Host	(Future) Specifies a non-local database host system

This display is used to select the database that is to be used to initialize telemetry information in the simulator. The Username and Password fields must be entered. When the **Apply** button is clicked, an attempt is made to connect to the specified database with the account information provided. Information about the successful or unsuccessful configuration using the database is reported to the event message log region.

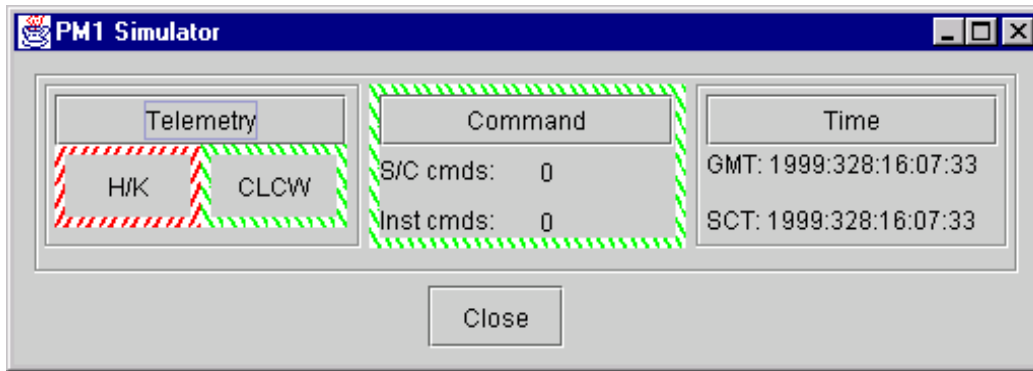
SCPM1-5.2 Run-time

The Run-time menu for SC contains the following three items.

Run-time Menu Item	Description
Control	Request the main display
Stop	Stop the module
Restart	Restart the module

SCPM1-5.2.1 Main Display

Clicking the “Control” option of the run-time menu causes the main display to appear.



This is the main display for the SC module, providing basic information about its current state, including the current GMT and spacecraft times, the number of valid spacecraft and instrument commands received, and the enabled/disabled status of command receipt and telemetry transmission. The latter are indicated by colored diagonal stripes around the appropriate box: the entire command box for command status and the telemetry channel boxes for each telemetry channel. Red stripes angling up and to the right indicate disabled, while green stripes angling down and to the right indicate enabled.

Left or right clicking on button boxes in the main window allows access to subordinate displays. Descriptions of the displays below will include how to access the display.

SCPM1-5.2.1.1 Telemetry

There are three buttons in the telemetry area of the main display: **Telemetry**, **H/K**, and **CLCW**. Clicking the **Telemetry** button brings up a menu with the following items.

Telemetry Menu Item	Description
Modify packet...	Modify packet data area on byte basis
Display packet...	Display packet header and contents
Display status...	Enable/disable status and packet transmit counts, by channel
Control Packet...	Change the frequency of the packet transmission
Modify CUC...	Modify the CCSDS Unsegmented Time Code

Clicking on the **H/K** or **CLCW** channel buttons brings up a menu with the following items:

Channel Menu Item	Description
Start	Enable telemetry packet transmission on channel
Stop	Disable telemetry packet transmission on channel

SCPM1-5.2.1.1.1 Modify Packet Display

This display allows the user to modify the data area of the packet on a byte or repeating byte basis. All of the following fields must be entered.

Data Entry Field	Description
APID	Application ID of the packet to be modified
Start Byte	First byte to change

Stop Byte	Last byte to change
Value (Hex)	Value to change byte(s) to, in hexadecimal

Clicking the **Apply** button causes the action defined by the fields to take effect. Clicking the **Close** button closes the window with no action taken.

SCPM1-5.2.1.1.2 Telemetry Packet Display

The telemetry packet display shows the header and, optionally (by pressing the **Dump** button), the contents of the most recent telemetry packet sent with the given APID.

The user must enter a valid APID value in the APID field and then click the **Apply** button before any other values will be reported.

Clicking the **Dump** button will bring up a standard dump display with the contents of the packet. Clicking the **Modify** button will bring up the Modify Tlm Packet Header Display shown below. Clicking the **Close** button closes the window with no action taken.

The Modify Tlm Packet Header display allows the user to modify fields in the packet header. Click on an enable box to the left of the field to enable modification of a specific header field. Clicking the **Apply** button puts the settings into effect. Clicking the **Close** button closes the display with no action taken.

Data Entry Field	Description
Version	CCSDS packet version number
Type	CCSDS packet type

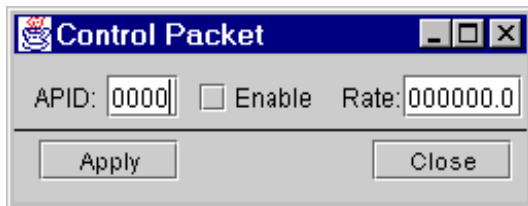
SH Flg	Secondary header flag
APID	Application identifier (packet number)
Seq Flg	Sequence flag
Seq Cnt	Packet sequence counter
Pkt Len	Packet length for data zone (seven less than actual length)

SCPM1-5.2.1.1.3 Telemetry Status Display

The telemetry status display shows the enabled or disabled status and the number of packets transmitted for each of the two telemetry channels. Clicking the **Reset** button will reset the count of packets transmitted for that channel. Clicking the **Close** button closes this window with no additional action taken.



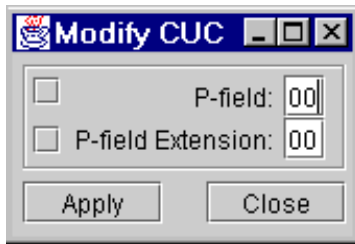
SCPM1-5.2.1.1.4 Control Packet Display



This display allows the user to control whether or not a packet is transmitted and at what rate (time between transmissions) it is generated. Clicking the **Apply** button puts the settings into effect. Clicking the **Close** button exits the display with no action taken.

Data Entry Field	Description
APID	Application ID of the packet to be modified
Enable	If set, packet is formatted and sent
Rate	Time between packet transmissions, in seconds. Note: Setting this value to 0 will hang the system.

SCPM1-5.2.1.1.5 Modify CCSDS Unsegmented Time Code



This display allows the user to modify the fixed fields of the CCSDS Unsegmented Time Code (CUC) in the telemetry packet headers. Clicking the enable boxes at left indicate whether or not the given field should be modified. Clicking the **Apply** button puts the settings into effect. Clicking the **Close** button closes the display with no action taken.

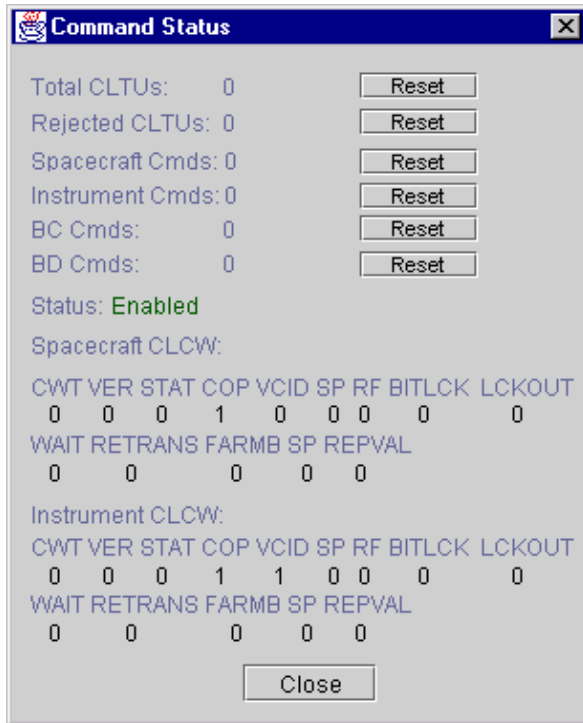
Data Entry Field	Description
P-field	P-field flags in the CUC. Enter hexadecimal value.
P-field Extension	Second byte of p-field, containing number of leap seconds since 1958. Enter hexadecimal value.

SCPM1-5.2.1.2 Command

Clicking the **Command** button on the main display brings up a menu with the following choices.

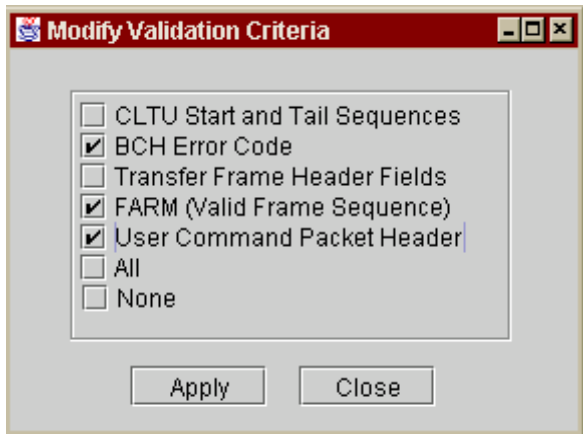
Menu item	Description
Start	Enable command reception
Stop	Disable command reception
Display Status...	Enable/disable status, command counts, CLCWs by virtual channel
Modify Validation Criteria...	Allows modification of validation options
Display Spacecraft Packet...	Displays spacecraft virtual channel packet contents
Display Instrument Packet...	Displays instrument virtual channel packet contents
Override CLCWs	Edit the fields of the Command Link Control Words

SCPM1-5.2.1.2.1 Display Command Status



When the “Display Status...” option is selected, this display is shown. The command status display shows command counters, command enabled or disabled status and the Command Link Control Words (CLCWs) for the spacecraft and instrument virtual channels. Clicking the **Reset** button sets the counter in that row to zero.

SCPM1-5.2.1.2.2 Modify Validation Criteria



When the “Modify Validation Criteria” option is selected, this screen is displayed. The operator may select any combination of the validation options. The operator may enable all of the validation tests by selecting the “All” option or disable all of the validation tests by selecting the “None” option. The **Apply** button is used to activate the new settings. The **Close** button is used to dismiss the screen without changes.

SCPM1-5.2.1.2.2.1 None Validation Option

Even when the “None” option is selected the following validation tests are performed:

- A received CLTU must be long enough to contain a start sequence, a single codeblock, and a tail sequence or it will be rejected and an error event message will be generated.
- A CLTU’s length will be checked to see there are enough bytes for a start sequence, tail sequence, and an even multiple of codeblocks. If there are extra bytes, they will be reported in a warning event message. The CLTU will then be processed as if there were no extra bytes. The existence of “extra” bytes may indicate a problem with the source system’s formatting of the CLTU.

- The Transfer Frame Header Length field must report a value big enough to contain a transfer frame header and a single byte of data or it will be rejected and an error event message will be generated.
- The Transfer Frame Header Length field is compared to the actual length of the passed frame buffer. If there are more data bytes than are reported in the header, these bytes are compared to the fill data byte. If there are any “extra” bytes that are not fill data, a warning event message will be generated. The transfer frame will then be processed and the “extra” bytes will be ignored. The existence of “extra” non-fill bytes may indicate a problem with the source system’s formatting of the Transfer Frame.
- The Transfer Frame Header VCID is used to determine whether the frame should be processed as a critical TIE-A command, critical TIE-B command or passed to the spacecraft or instrument virtual channel Frame Acceptance and Reporting Mechanism (FARM). The VCID must match one of the four expected VCID values stored in the container. Container points Pm1cmdCriticalTieAVCID and Pm1cmdCriticalTieBVCID specify the VCID values for the TIE critical commands. For the spacecraft and instrument virtual channels, VCID values are stored within the associated Command Link Control Word (CLCW). The CLCWs are maintained in container buffers Pm1cmdSpacecraftCLCW and Pm1cmdInstrumentCLCW. When a VCID does not match any of the expected values, the transfer frame is rejected and an error event message is generated.

SCPM1-5.2.1.2.2.2 CLTU Start and Tail Sequences Validation Option

When the CLTU validation has been enabled, the following tests are done:

- The start sequence of the received CLTU must match the expected start sequence stored in the container buffer Pm1cmdCltuExpectedStartSequence or the CLTU will be rejected. An error event message will be generated which contains hexadecimal dumps of the expected and received start sequences that did not match.
- The tail sequence of the received CLTU must match the expected tail sequence stored in the container buffer Pm1cmdCltuExpectedTailSequence or the CLTU will be rejected. An error event message will be generated which contains hexadecimal dumps of the expected and received tail sequences that did not match.

SCPM1-5.2.1.2.2.3 BCH Error Code Validation Option

When Bose-Chaudhuri-Hocquenghem (BCH) Error Code validation is enabled, the parity byte of each received codeblock is compared to the parity value calculated from the codeblock data area. If a parity comparison fails, both parity bytes are reported in an error event message and the current CLTU is rejected.

SCPM1-5.2.1.2.2.4 Transfer Frame Header Validation Option

Validation of the Mode, SCID, VCID, Frame Length and Frame Sequence Count fields of the Transfer Frame Header could result in error status codes being reported in the

CLCW for the frame's virtual channel. This is mission specific to PM-1. Therefore validation of those fields is done during FARM validation and not as part of the Transfer Frame Validation. When Transfer Frame Validation is enabled, the following validations are done.

- The Transfer Frame Header Version field must contain 0 or the frame is rejected and an error event message is generated.
- The Transfer Frame Header Spare field must contain 0 or the frame is rejected and an error event message is generated.

SCPM1-5.2.1.2.2.5 Farm (Valid Frame Sequence) Validation Option

When the FARM validation is enabled, all fields related to the setting of the CLCW are checked. FARM validation includes the following tests:

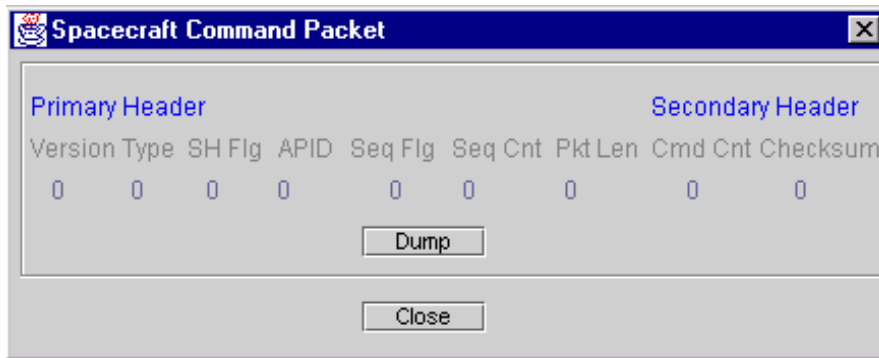
- The Transfer Frame Header Length is tested to be within the range specified in the ICD. If the length is invalid, the "Incorrect Frame Length" status is stored in the CLCW, the frame is rejected, and an error event message is generated.
- The Transfer Frame Header Length is compared to the actual length of the received buffer. If the frame contains fewer bytes than reported in the header, the "Incomplete Frame" status is stored in the CLCW, the frame is rejected, and an error event message is generated.
- The Transfer Frame Header Mode flags are checked. If the mode is "AC", the "Illegal frame type (Type-AC)" status is stored in the CLCW, the frame is rejected, and an error event message is generated.
- If the Transfer Frame Header Mode flags specify "BC", the frame data is checked for a valid transfer frame control command. If the frame data does not contain a valid frame control command, the "Illegal Type-BC frame" status is stored in the CLCW, the frame is rejected, and an error event message is generated.
- The Transfer Frame Header VCID field is compared to the VCID field from the FARM's CLCW. If the VCID fields do not match, the "Illegal VCID" status is stored in the CLCW, the frame is rejected, and an error event message is generated.
- If the Transfer Frame Header SCID field does not match the PM-1 SCID stored in container point Pm1cmdSCID, the "Illegal SCID" status is stored in the CLCW, the frame is rejected, and an error event message is generated.
- The Transfer Frame Header Sequence field is subjected to the FARM-1 protocol and the CLCW flags, FARM-B Counter, and Report Value fields will be updated accordingly. Event messages are generated for every transfer frame that fails the acceptance test.

SCPM1-5.2.1.2.2.6 User Command Packet Header Validation Option

When Packet validation is enabled, fields in the packet header will be validated as specified in the EOS PM-1 Spacecraft to Ground ICD.

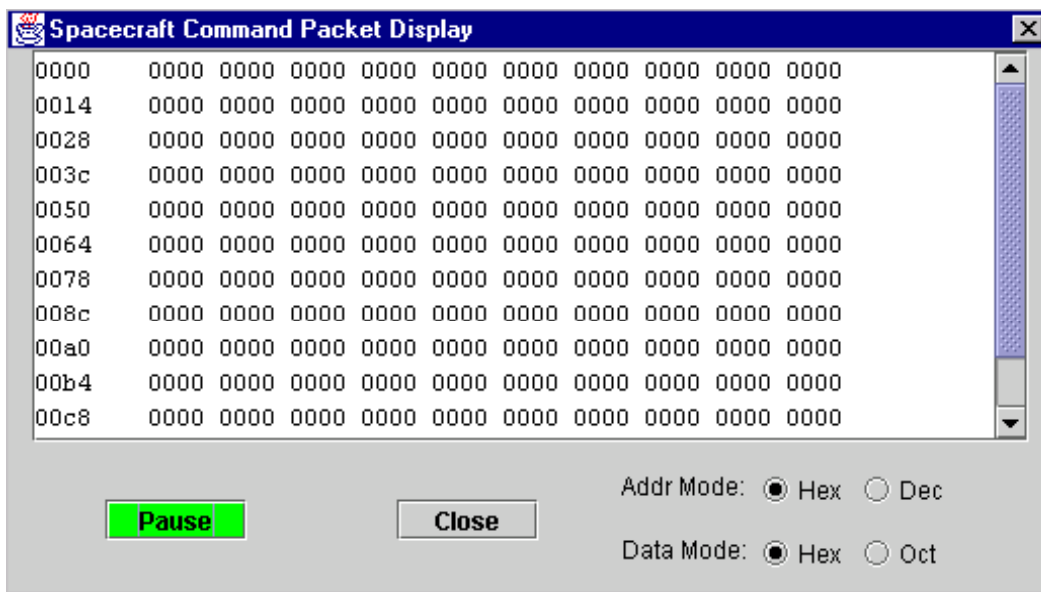
SCPM1-5.2.1.2.3 Display Spacecraft Packet

This display shows the spacecraft virtual channel packet header. A dump of the full packet buffer may be requested by pressing the **Dump** button.



The dialog box titled "Spacecraft Command Packet" contains a table with two sections: "Primary Header" and "Secondary Header". The table has columns for Version, Type, SH Flg, APID, Seq Flg, Seq Cnt, Pkt Len, Cmd Cnt, and Checksum. All values are currently 0. Below the table are "Dump" and "Close" buttons.

Primary Header					Secondary Header			
Version	Type	SH Flg	APID	Seq Flg	Seq Cnt	Pkt Len	Cmd Cnt	Checksum
0	0	0	0	0	0	0	0	0



The window titled "Spacecraft Command Packet Display" shows a table of packet data. The table has columns for address and data. The address column shows values from 0000 to 00c8 in increments of 0014. The data column shows 0000 for all entries. Below the table are "Pause" and "Close" buttons. To the right of the buttons are radio buttons for "Addr Mode" (Hex selected, Dec unselected) and "Data Mode" (Hex selected, Oct unselected).

0000	0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0014	0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0028	0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
003c	0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0050	0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0064	0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0078	0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
008c	0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
00a0	0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
00b4	0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
00c8	0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000

The address region may be displayed in decimal or hexadecimal. The data region may be displayed in hexadecimal or octal. Since this display normally updates as the buffer contents are changed, use the **Pause** button to freeze the current contents. Use of the **Pause** button does not affect command packet reception. When the **Pause** button has been used, the button's label is changed to **Cont** (for continue). Press the **Cont** button to resume screen updates. Note that the display is updated to show the last command packet received. Intermediate packets received while the display was frozen can not be displayed.

SCPM1-5.2.1.2.4 Display Instrument Packet

This display shows the instrument virtual channel packet header. Optionally, a dump of the full packet buffer may be requested. They are very similar in appearance and

function to the spacecraft packet header and packet dump displays that are described in the previous section.

SCPM1-5.2.1.2.5 Override CLCWs

This display shows the Command Link Control Words (CLCWs) for the two virtual channels broken out into bit fields. Any field may be overridden by checking the field's selection box and then typing in the new decimal value. The new value takes affect when the **Apply** button is pressed. Note that since these are bit fields, attempts to assign values that are too large will result in truncation of the value. Review changes on the CLCW portion of the Command Status display. Event messages also show the values assigned.

Field	Spacecraft CLCW Value	Instrument CLCW Value
CWT	0	0
VER	0	0
STAT	0	0
COP	1	1
VCID	00	01
SP1	0	0
RF	0	0
BITLCK	0	0
LCKOUT	1 (checked)	0
WAIT	0	0
RETRANS	0	0
FARMB	0	0
SP2	0	0
REPVAL	000	000

CLCW Field	Description
CWT	Control Word Type (1 bit)
VER	Version (2 bits)
STAT	Status (3 bits)
COP	Command Operations Procedure (COP) in Effect (2 bits)
VCID	Virtual Channel Identification (6 bits)
SP1	Spare field 1 (2 bits)
RF	No RF Available Flag (1 bit)
BITLCK	No Bit Lock (1 bit)
LCKOUT	Lockout Flag (1 bit)
WAIT	Wait Flag (1 bit)
RETRANS	Retransmission Flag (1 bit)

FARMB	FARM-B Counter (2 bits)
SP2	Spare field 2 (1 bit)
REPVAL	Report Value (8 bits)

SCPM1-5.2.1.3 Time

The time area of the main display shows the current Greenwich Mean Time (GMT) and spacecraft time fields. The GMT is a reflection of the simulated time of the SC module, i.e., what time will be used to model external events (transitions to day or night, for example) within the module. It is not currently used. The spacecraft time is the time that the spacecraft thinks it is. In particular, it is the time (in the appropriate format) that goes into the secondary header of the telemetry packets generated by the SC module.

Clicking the **Time** button brings up a menu with one selectable item, "Modify Times...". Selecting this item brings up the modify times display described below.

SCPM1-5.2.1.3.1 Modify Times Display

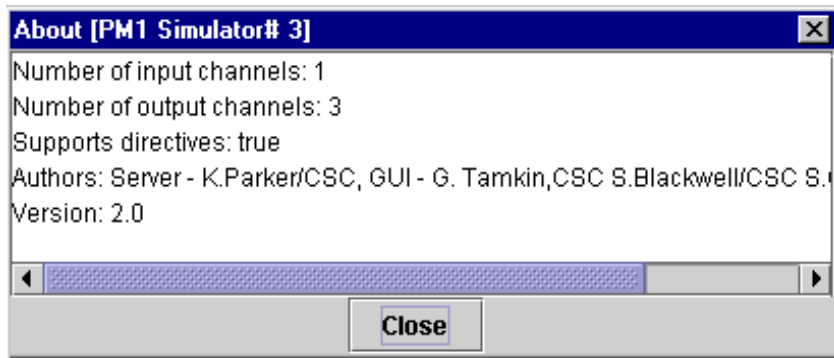
The modify times display allows the user to set the GMT or spacecraft time manually, retain the time currently being used, or reset the time to the current system time.

Clicking the **Apply** button will cause the requested actions to take effect. Clicking the **Close** button closes the window with no further action taken.

Field	Description
yyyy	Year
ddd	Day of year
hh	Hour of day
mm	Minute of hour
ss	Second of minute
Keep	Don't update time
Reset	Change time to current system time
Set	Set time to value supplied

SCPM1-5.3 About

Clicking the “About” option of the module pop-up menu requests a display similar to the following that lists the numbers of input and output channels.



SCPM1-6.0 Special Operating Instructions

There are no special operating instructions for this release.

Internet Protocol (IP) Modules

IP-1.0 Overview

The Input and Output Internet Protocol (IP) modules receive/send data packets from/to other sources/destinations using one of several IP types (TCP/IP-Client, TCP/IP-Server, UDP Multicast, or UDP Unicast). The Input IP module receives data from an external project and passes that data on to another module. The Output IP module receives data from a module and passes that data to another module or external project. Both the Input and Output IP modules are discussed in this one section because of their great similarity.

IP-2.0 Inputs

The Input IP module does not have any input channels. The Output IP module has a single input channel, which is listed below.

Ch.	Data expected	Validation performed	Processing performed
1	Packets	None	Data is received from another module and sent to an external destination.

IP-3.0 Outputs

Both the Input IP and Output IP modules have a single output channel.

Ch.	Description
1	Input IP module sends received data to another module. Output IP module sends transmitted data to another module (usually Log Module).

IP-4.0 Container Items

IP module container items are not accessible via operator directives, so they are not listed here.

IP-5.0 Displays

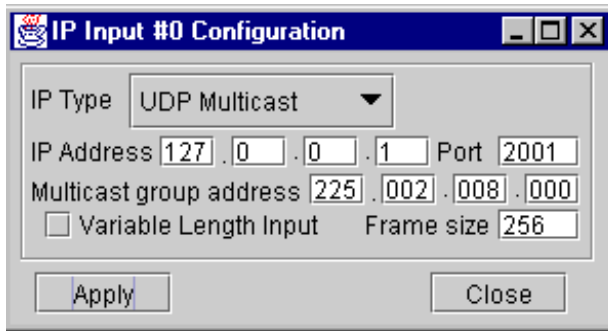
To access displays for a module, click in the center of the module in the project window. The following pop-up menu choices will appear. The “Remove” option can be used during project design to remove this module. The “Configure” option should be used prior to running the project and is unavailable at run-time. The Run-time option is available only when the project is running.

Module Pop-Up Menu Item	Description
Configure	Access the configuration display
Run-time	Access the Run-time menu for the module

Remove	Remove module from the project
About	Display generic module information

IP-5.1 Configuration

Clicking on the Input IP module pop-up menu “Configure” item produces the following display.



The default settings for the Input IP module are shown. There are 4 possible IP Types: UDP Multicast, TCP/IP-Client, TCP/IP-Server, and UDP Unicast. The IP Type may be changed by selection from a drop-down menu. When the UDP Multicast choice is selected, the Multicast group address field is activated.

Enter the IP address in the IP address field.

Enter the port number for the incoming data in the Port field.

Enter the Multicast group address if using the UDP Multicast IP type. You must change the multicast group address from the default value if using the UDP Multicast IP type. The multicast group address range is 224.0.0.1 to 239.255.255.255.

For fixed length input/output data, enter the fixed size in bytes in the Frame size field. If this size is larger than the actual data, the additional bytes will be filled with binary zero. If the frame size is smaller than the actual data size, the data bytes will be truncated to the specified frame size. The specified number of bytes will be passed to the next module or external destination.

For variable length input/output data, check the Variable Length box. The actual length of each data packet will be used, without truncation or padding. When this option is selected, the Frame size field is desensitized.

Click the **Apply** button to save your settings. Click the **Close** button to dismiss the Configuration display without making any changes.

The Output IP module may be configured in similar fashion.

IP-5.2 Run-time

Click on the module pop-up menu “Run-time” option to request the Run-time Menu.

Run-time Menu Item	Description
Restart	Restart the IP module
Stop	Stop the IP module
Show Raw Packet	Request Raw Packet Display
Show Status	Request Status Display

IP-5.2.1 Restart

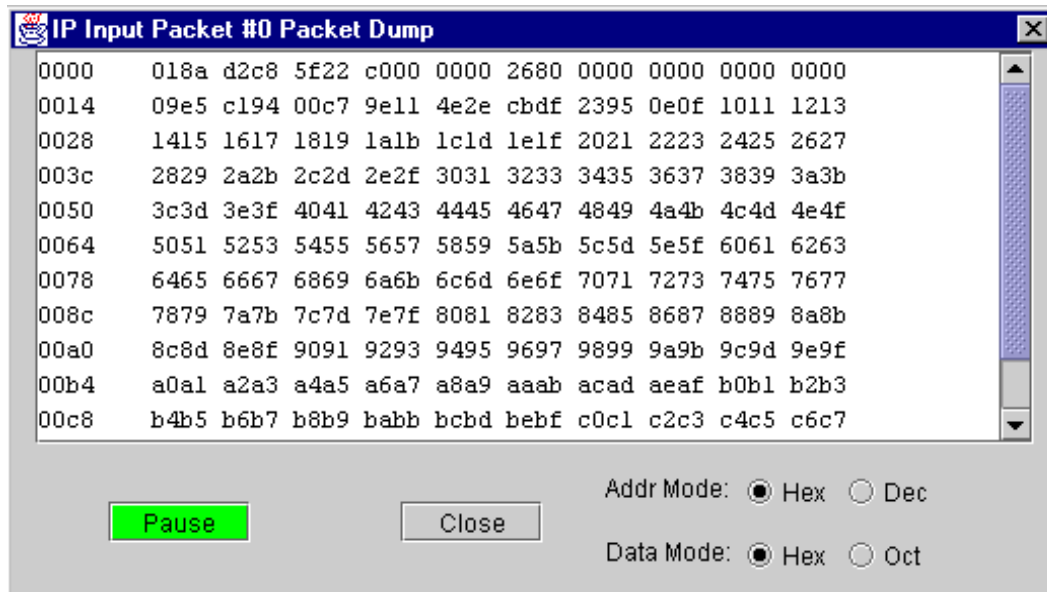
After an individual module has been stopped, select “Restart” from the Run-time Menu to restart the module. The color around the module’s border will change from red-striped (indicates stopped state) to green-striped (indicates run state).

IP-5.2.2 Stop

Select “Stop” from the Run-time Menu to stop the IP module’s processing. The color around the module’s border will change from green-striped (indicates run state) to red-striped (indicates stopped state). Once the module has been stopped, the “Configure” option of the module pop-up menu is available again and the module may be reconfigured. The Restart option must then be used to return to run mode.

IP-5.2.3 Show Raw Packet

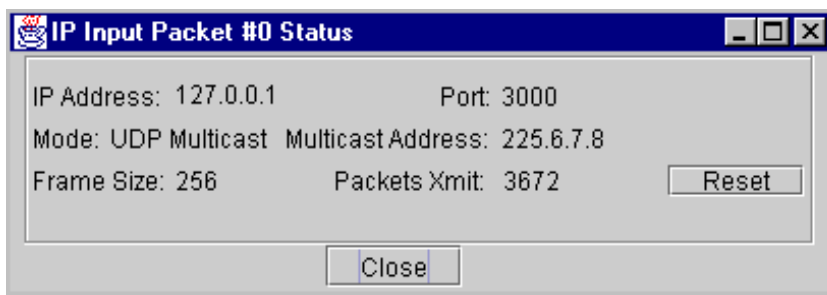
Select “Show Raw Packet” from the Run-time Menu to show raw packets received by the module. This produces a display similar to that shown below.



The address region may be displayed in decimal or hexadecimal by clicking on the respective radio button. Likewise, the data region may be displayed in hexadecimal or octal. Since this display updates as the buffer contents are changed, the **Pause** button may be used to freeze the current contents. Use of the **Pause** button does not affect data transmission or reception. When the **Pause** button has been used, its label is changed to **Cont** for continue. Press the **Cont** button to resume screen updates. Note that the display will update with the last packet processed. Packets not shown while the display was frozen can not be displayed. Click the **Close** button to dismiss the display.

IP-5.2.4 Show Status

Select the “Show Status” item to request the module’s status. This produces a display similar to that shown below.



This display shows the Input IP module’s address, port number, IP type, multicast group address (if the IP type is UDP multicast), Frame size, and number of packets received. If variable length items are being received, the Frame size field will show the most recent size. The **Reset** button may be clicked to reset the number of packets received count. Click the **Close** button to dismiss the display. The Output IP module’s Status Display is very similar.

IP-5.3 About

Selecting the “About” option from an IP module pop-up menu produces a display that lists the module’s number of inputs and outputs, whether directives are allowed, names of authors and the version number.

IP-6.0 Special Operating Instructions

There are no special operating instructions for this release.

Logging (LOG) Module

LOG-1.0 Overview

The Logging (LOG) module is responsible for writing data received on its input port to a specified log file.

Note: Delogging of logged data for on screen viewing or printing may be accomplished by means of an external program. The software used must be capable of displaying binary data in an ASCII representation. The shareware utility, Hexedit, which is available over the Internet from Alexander Reidel Informations-Systeme, is one such program.

LOG-2.0 Inputs

Ch.	Data expected	Validation performed	Processing performed
1	bytes	None	Received log data is written into the log file.

LOG-3.0 Outputs

The Log module does not have any output channels.

LOG-4.0 Container Items

Log module container items are not accessible via operator directives, so they are not listed here.

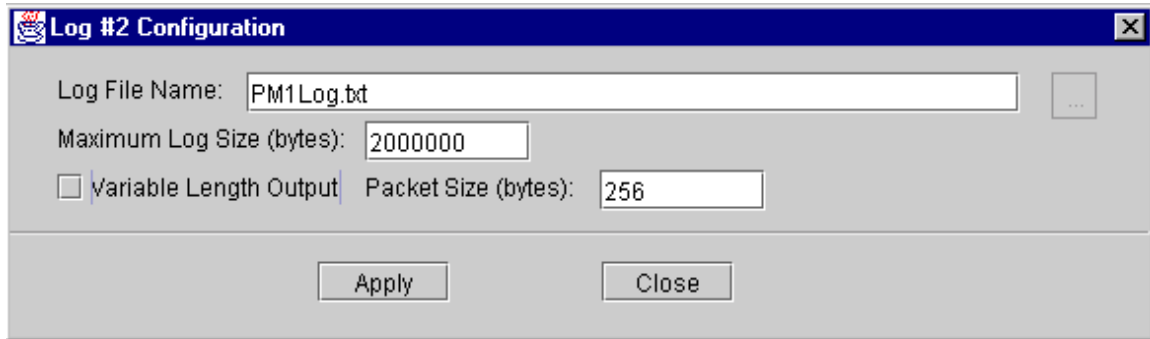
LOG-5.0 Displays

To access displays for this module, click in the center of the log module in the project window. The following pop-up menu choices will appear. The “Remove” option can be used during project design to remove this module. The “Configure” option should be used prior to running the project and is unavailable at run-time. The Run-time option is available only when the project is running.

Module Pop-Up Menu Item	Description
Configure	Access the configuration display
Run-time	Access the Run-time menu for the Log module
Remove	Remove the Log module from the project
About	Display Information about the module

LOG-5.1 Configuration

Selecting the “Configure” pop-up menu option produces a display similar to the following screen.



LOG-5.1.1 Log File Name

The Log File Name specifies where the log data is written. If this file already exists, its data will be overwritten. If there is more than one log module in a project, they cannot write to the same log file.

LOG-5.1.2 Maximum Log Size

The maximum log size in bytes limits the amount of storage used for logging. When this maximum is reached, the log file is closed and an event message is generated.

LOG-5.1.3 Packet Size

The packet size in bytes determines the size of the buffer written to the log file. A packet size that is smaller than the actual data buffer received will result in truncation of the data that is logged. A packet size that is larger than the actual data buffer received will be zero filled to the packet size and then written to the log file.

LOG-5.1.4 Variable Length Output

When the variable length output box has been checked, varying length records are written to the log file. No truncation or padding of received data is done. When this field is checked, the packet size field is desensitized.

LOG-5.2 Run-time

Clicking the “Run-time” option of the Log module pop-up menu produces a Run-time menu. There are three items in the menu list.

Log Run-time Menu Item	Description
Restart	Start the Log module again after a stop
Stop	Stop the Log module.
Show Status	Show information on the log file.

LOG-5.2.1 Restart

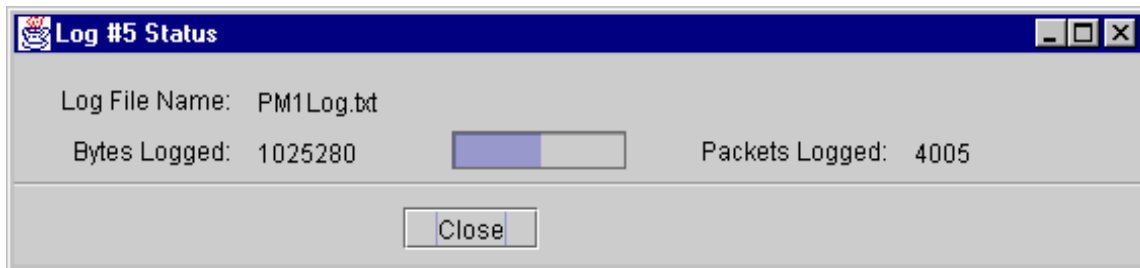
The Log module may be restarted after being stopped. The specified Log File will be created and possibly overwritten. All of the associated counters will start over from zero.

LOG-5.2.2 Stop

The Log module may be stopped independently of the other modules in the project. After it has been stopped, the user may return to the Configuration screen and change the Log File Name, Log Packet Size or Maximum Log Size.

LOG-5.2.3 Show Status

When the “Show Status” option is selected from the Run-time Menu, a screen like the following is displayed. The bar in the center of the screen shows the percentage of the log area in use. The blue portion of the bar represents the logged data.



LOG-5.3 About

Selecting the “About” option from the module pop-up menu produces a display that lists the module’s number of input links, number of output links, whether directives are allowed, names of authors and the version number.

LOG-6.0 Special Operating Instructions

If more than one Log module is being used in a project, they must be configured to write to different files.

The Log module does not accept operator directives.

SIMSS/PM-1 ACRONYMS

APID	Application Identifier
BCH	Bose-Chaudhuri-Hocquenghem
C&DHS	Command and Data Handling System
CADU	Channel Access Data Unit
CCSDS	Consultative Committee on Space Data Systems
CERES	Clouds and the Earth's Radiant Energy System
CLCW	Command Link Control Word
CLTU	Command Link Transmission Unit
COP	Command Operations Procedure
COTS	Commercial, off-the-shelf
CUC	CCSDS Unsegmented Time Code
CSC	Computer Sciences Corporation
EBnet	EOSDIS Backbone Network
EDOS	EOS Data and Operations System
EDU	EDOS Data Unit
EGS	EOS Ground System
EMOS	EOS Mission Operations System
EOS	Earth Observing System
EOSDIS	Earth Observing System Data and Information Systems
EPGS	EOS Polar Ground Stations
ETS	EOSDIS Test System
FARM	Frame Acceptance and Reporting Mechanism
FTP	File Transfer Protocol
GMT	Greenwich Mean Time
GS	SIMSS Ground Station Module
GUI	Graphical User Interface
ICD	Interface Control Document
IP	Internet Protocol
NT	New Technology
ODB	Operational Database
PC	Personal Computer
PDB	Project Database
PM-1	Afternoon equatorial crossing spacecraft series
SC	SIMSS Spacecraft Module
SIMSS	Scalable Integrated Multimission Simulation Suite
SIMSS/PM-1	SIMSS/PM-1 Simulator
SORD	Spacecraft Operations Requirements Document
TCP	Transmission Control Protocol
TIE	Transponder Interface Electronics
UDP	User Datagram Protocol
VCDU	Virtual Channel Data Unit
VCID	Virtual Channel Identification
Y2K	Year 2000 compliance